[redacted], I.A.

Ninth Mendeleev Congress on General and Applied Chemistry.
Kauch i rez. 24 no.8:56 '65. (MIRA 18:10)

SHEFTEL', I.A.

Enterprises of the chemical industry at the eve of the 22d Congress of the CPSU. Khim.prom. no.5:366-367 My '61. (MIRA 14:6)
(Chemical industries)

SHLYAEL', I.A.

All-Union Conference on the Chemicals for the Protection of Plants. Khim. prom. no.7:515-516 Jl '61. (MIRA 14:7)
(Plants, Protection of--Congresses)

KHABAROV, V.P.; SHEFTEL', I.A.

Scientific and Technological Conference on the Coordination of Scientific Research and Experimental Construction in the Rubber Industry. Kauch. i rez. 20 no.6:55-57 Je '61. (MIRA 14:6)
(Rubber industry--Congresses)

SHEFTEL', I.A.

Conference on the improvement of the scientific and technical information in the rubber, carbon black, reclaiming, asbestos engineering, and tire re-treading industries. Kauch.i rez. 20 no.7:54-57 Jl '61. (MIRA 14:6)
(Rubber industry--Congresses)

SHEFTEL', I.A.

Composite crew organized by the All-Union Scientific Research Institute of Asbestos Engineering Goods. Kauch.i rez. 21 no.1: 57 Ja '62, (MIRA 15:1)

(Asbestos)

KHABAROV, V.P.; SHEFTEL', I.A.

Scientific and technical conference on the coordination of works on research and experimental design in the industry of rubber goods for engineering uses. Kauch.i rez. 21 no.4:50-52 Ap '62. (MIRA 15:4)

(Rubber research--Congresses)

SHEFTEL', I.A.

Scientific and technical conference on the mechanization of the production of shaped rubber goods. Kauch.i rez. 21 no.12:53-54 D '62. (MIRA 16:1)
(Rubber industry—Equipment and supplies)

SHEFTEL', I.A.

Encyclopedia of "Structural materials." Kauch. i rez. 22 no.10:62 O '63. (MIRA 16:11)

TUMANOV, A.T., glav. red.; VYATKIN, A.Ye., red.; GARBAR, I.I., red.; ZAYMOVSKIY, A.S., red.; KARGIN, V.A., red.; KISHKIN, S.T., red.; KISHKINA-KATNER, S.I., doktor tekhn. nauk, red.; PANSHIN, B.I., kand. tekhn. nauk, red.; ROGOVIN, Z.A., red.; SAZHIN, N.P., red.; SKLYAROV, N.M., doktor tekhn. nauk, red.; FRIDLYANDER, I.N., doktor tekhn. nauk, red.; SHUBNIKOV, A.V., red.; SHCHERBINA, V.V., doktor geol.-miner. nauk, red.; SHRAYBER, D.S., kand. tekhn. nauk, red.; GENEL', S.V., kand. tekhn. nauk, red.; VINOGRADOV, G.V., doktor khoz. nauk, red.; NOVIKOV, A.S., doktor khoz. nauk, red.; KITAYGORODSKIY, I.I., doktor tekhn. nauk, red.; ZHEREBKOV, S.K., kand. tekhn. nauk, red.; BOGATYREV, P.M., kand. tekhn. nauk, red.; SANDOMIRSKIY, D.M., D.M., kand. tekhn. nauk, red.; BUROV, S.V., kand. tekhn. nauk, red.; POTAK, Ya.M., doktor tekhn. nauk, red.; KUKIN, G.N., doktor tekhn. nauk, red.; KOVALEV, A.I., kand. tekhn. nauk, red.; YAMANOV, S.A., kand. tekhn. nauk, red.; SHEFTEL', I.A., kand. khoz. nauk, st. nauchn. red.; BABERTSYAN, A.S., inzh., nauchn. red.; BRAZHNIKOVA, Z.I., nauchn. red.; KALININA, Ye.M., mlad. red.; SOKOLOVA, V.G., red.-bibliograf; ZENTSEL'SKAYA, Ch.A., tekhn. red.

[Building materials; an encyclopedia of modern technology] Konstruktsionnye materialy; entsiklopediia sovremennoi tekhniki. Glav. red. A.T.Tumanov. Moskva, Sovetskaia entsiklopediia. Vol.1. Abliatsiia - korroziia. 1963. 416 p. (MIRA 17:3)

1. Chlen-korrespondent AN SSSR (for Kishkin).

MARICHEV, R.D., inzh.; SHEGALOV, I.L., inzh.

Nomograms for determining power losses in electric power transformers. Elek. sta. 32 no.7:49-54 Jl '61. (MIRA 14:10)
(Electric transformers) (Electric power distribution)

SHEFTEL' , I. M.

USSR 600

Persimmon

Persimmon (Diospyros lotus) in Tajikistan. Priroda 41 No 3, 1952

9. Monthly List of Russian Accessions, Library of Congress, July 1958. Unclassified.

Country : USSR [illegible]

CATEGORY :

ABS. JOUR. : [illegible] No. [illegible] 1958, No. [illegible]

AUTHOR : [illegible]

INST. : [illegible] Scientific Research Institute of *

TITLE : Concerning Profitableness of Growing Citrus Fruit in Pits in the [illegible].

ORIG. PUB. : [illegible]

ABSTRACT : On the basis of an analysis of the operation of the [illegible] of the collective farm [illegible] in the [illegible] Rayon, over the period of 1951-195[illegible], it is shown that growing of lemons in pits is profitable.

CARD: 1/1 * Orchard Growing, Viniculture and Subtropical Crops

TSULAYA, V.I.; SHEFTEL', I.M.

Trench culture of citrus fruits in Central Asia. Agrobiologiia no.1: 102-108 Ja-F '58. (MIRA 11:2)

1. Tadzhikskiy nauchno-issledovatel'skiy institut sadovodstva, vinogradarstva i subtropicheskikh kul'tur imeni I.V. Michurina, Stalinabad.
(Tajikistan--Citrus fruits)

SHEFTEL', I. M.

Cand Agr Sci - (diss) "Generalization of production experience of trench cultivation of citrus crops in Tadzhikistan and its agro-economic foundation." Stalinabad, 1961. 19 pp; (Academy of Sciences Tadzhik SSR, Division of Agr and Biol Sci); 200 copies; price not given; bibliography on pp 18-19 (14 entries); (KL, 10-61 sup, 223)

SHEFTEL', I.M.

Main results of the six-year period of trench culture of citrus fruits in Central Asia and problems of its economy. Biul.VNIICHiSK no.2: 107-115 '57. (MIRA 15:5)

1. Tadzhikskiy nauchno-issledovatel'skiy institut sadovodstva i subtropicheskikh kul'tur im. Michurina, gor.Stalinabad.
(Soviet Central Asia--Citrus fruits)

SHEFTEL', I.M.

Yield of Meier lemon on collective farms of Tajikistan.
Agrobiologiia no.2:294-295 Mr-Ap '62. (MIRA 15:4)

1. Tadzhikskiy sel'skokhozyaystvennykh institut, g. Dushanbe.
(Tajikistan—Lemon)

Electrical conductivity and thermoemf of complex semiconductors in the ternary system $MnO-CrO-NiO-O_2$. Ya. V. Pavlotskiy, I. T. Sheftel'.

Physico-chemical investigation and electrical properties of materials in the system $CdO-TiO_2$. T. N. Yegorova, Ye. V. Kurlina, I. T. Sheftel'.

Electrical properties of semiconducting barium titanates. T. N. Tekster-Proskuryakova, I. T. Sheftel'.

Report presented at the 3rd National Conference on Semiconductor Compounds, Kishinev, 16-21 Sept 1963

Investigation of the electrical conductivity and dielectric permeability of semiconducting materials in the system of the oxides of manganese and cobalt. V. N. Novikov.

Physico-chemical investigation and electrical conductivity of cobalto-titanium oxide semiconductors. T. N. Yegorova, Ye. V. Kurlina, I. T. Sheftel'.

Report presented at the 3rd National Conference on Semiconductor Compounds, Kishinev, 16-21 Sept 1963

SHEFTEL', I. ..

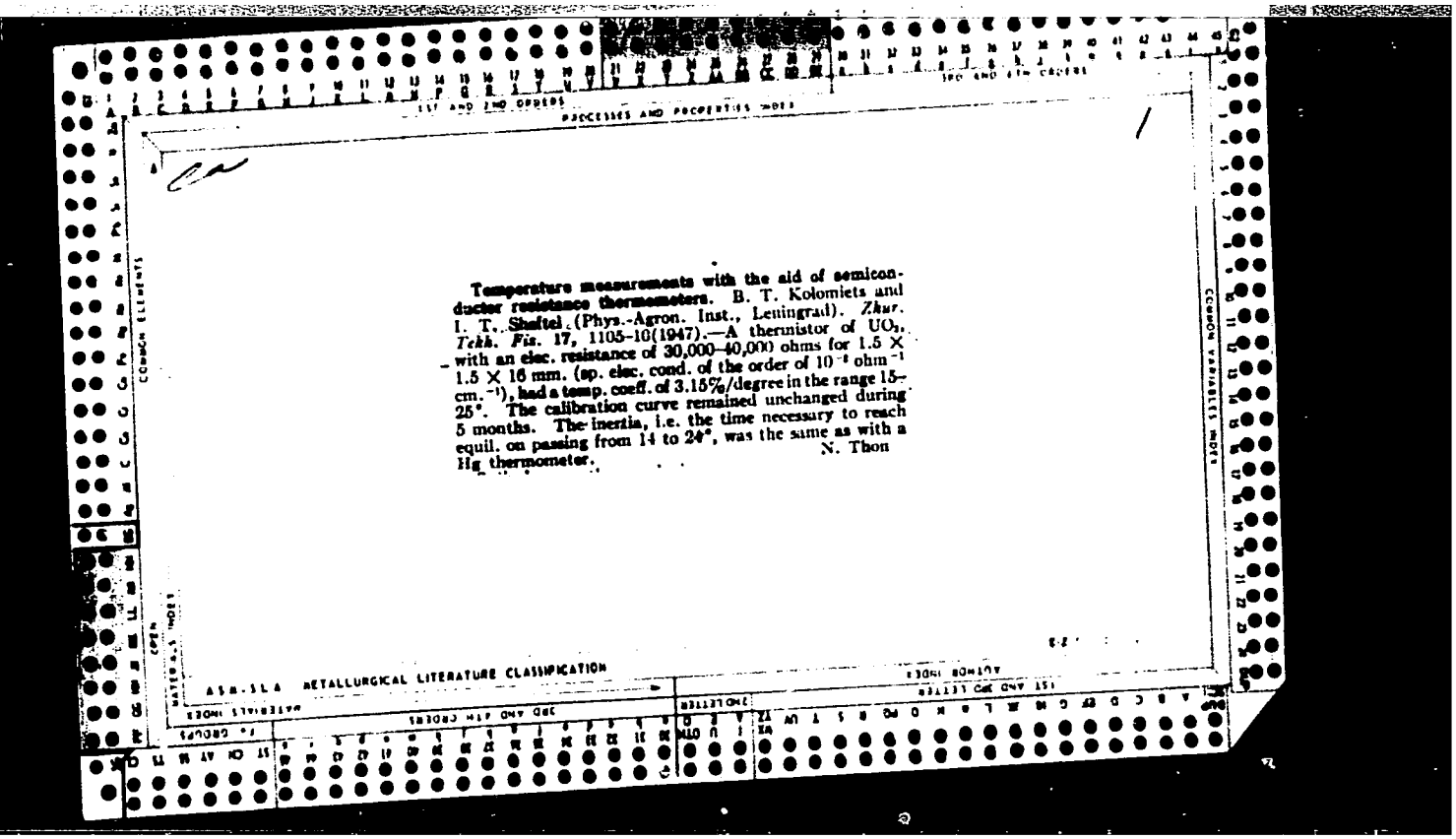
USSR/Chemistry - Manganese Compounds 11 Sep 52

"Structural Study of the CuO - Mn_3O_4 - O_4 System," Ye. V. Kurlina, V. G. Prokhvatilov, I. T. Sheftel'

"Dok Ak Nauk SSSR" Vol 86, No 2, pp 305-307

Between the temps 500-1,100°, the compd $CuMn_2O_4$ forms, which has a spinel structure. Between 1,000 and 1,1000, when the CuO content is increased, the solid soln $CuMn_2O_4$ is formed 1st. When the critical concn is reached, the material consists of a solid soln of $CuMn_2O_4$ in Mn_3O_4 and spinel. Presented by Acad D. S. Belyankin 12 Jul 52

PA 235T24



Temperature measurements with the aid of semiconductor resistance thermometers. B. T. Kolomiets and I. T. Shaftel. (Phys.-Agron. Inst., Leningrad). *Zhur. Tekh. Fiz.* 17, 1105–10(1947).—A thermistor of UO_2, with an elec. resistance of 30,000–40,000 ohms for 1.5 × 1.5 × 16 mm. (sp. elec. cond. of the order of 10^{-4} ohm^{-1} cm.$^{-1}$), had a temp. coeff. of 3.15%/degree in the range 15–25°. The calibration curve remained unchanged during 5 months. The inertia, i.e. the time necessary to reach equil. on passing from 14 to 24°, was the same as with a Hg thermometer. N. Thon

USSR/Electricity - Control Circuits Apr 51
Thermistors

178T61

"New Types of Thermistors," B. T. Kolomiyets, Cand Tech Sci, I. T. Sheftel', Engr, Sci Res Inst of Min of Communications Equipment Ind

"Elektrichestvo" No 4, pp 55-57

Gives description and characteristics of MMT-1, [illegible] MMT-4, and MMT-5 thermistors. The thermistors are made with resistances of 1,000-200,000 Ω at 20°C. They are designed for operation at temp of -100 to +120°C. Their time const (thermal inertia) is comparable with that of ordinary

[redacted] 178T61

USSR/Electricity - Control Circuits Apr 51
(Contd)

mercury thermometer, i.e., around 100 sec in air and 4 sec in water. Submitted 29 Sep 50.

[redacted] 178T61

USSR/Physics - Semiconductors, Thermo- resistances Mar/Apr 52

"New Industrial Thermoresistors," B.T. Kolomiyets, I.T. Sheftel'

"Iz Ak Nauk SSSR, Ser Fiz" Vol XVI, No 2, p 230

Abbreviated text of report, published in "Elektrichestvo" 4, 1951, and in the booklet "Thermoresistances, Semiconducting Resistances," 1950. Samples of resistances with a thermal coeff of -3% on $1^{\circ}C$ at relatively low resistance (1.10^3 to $2.10^{\circ}C$) were produced by applying mixts of Cu and Mn oxides. These resistances show great stability and long service

220T101

life in the range of -100 to +120°C. At present 3 types of resistances are produced; they may be employed for temp control and compensation of elec measuring instruments, etc. Their inertia is of the order of Hg thermometers.

220T101

SHEFTEL', I. T.

SHEFTEL', I.T. (Leningrad)

Semiconductor thermocompensators used for temperature compensation in linear resistances having positive thermal coefficients. Avtom. i telem. 14 no.2:215-230 Mr-Ap '53. (MLRA 10:3)
(Thermostats)

KOLOMIYETS, B.T.; SHEFTEL', I.T.; [illegible] V.V.; PAVLOVA G.I.

Industrial types of thermistors and their fields of [illegible] radiotekh. i elektron 1 no.8:1177-1185 Ag '56. (MLRA 10:1)

1. Nauchno-issledovatel'skiy institut Ministerstva radio-tekhnicheskoy promyshlennosti.
(Thermistors)

PAVLOVA, G.I. (Leningrad); SHEFTEL', I.T. (Leningrad)

Analysis of thermistor performance in thermal control systems based on the use of relay effect. Avtom. i. telem. 17 no.6:549-558 Je '56. (MLRA 9:10)

(Thermistors) (Electric relays)

SHEFTEL', Iosif Teodorovich, kand. tekhn. nauk; ACHKINADZE, Sh.D., inzh, red.; FREGER, D.P., tekhn. red.

[Thermistors] Termosoprotivleniia. Leningrad, Ob-vo po rasprostraneniu polit. i nauchnykh znanii RSFSR, 1957. 60 p. (Poluprovodniki, no.3). (MIRA 11:7)

(Thermistors)

SHEFTEL, I.T.

PA - 2044

AUTHOR: KOLOMIEC,B.T., ŠEFTEL', I.T., KURLINA,E.V.

TITLE: The Electric Properties of Some Oxide Semiconductors. (Russian).

PERIODICAL: Zhurnal Tekhnicheskoi Fiziki, 1957, Vol 27, Nr. 1, pp 51-72 (U.S.S.R.)

Received: 2 / 1957 Reviewed: 3 / 1957

ABSTRACT: The present paper discusses the principal results of the investigation of the electric properties of composed copper-manganese and cobalt-manganese oxide semiconductors. The synthesis of the sample of various compositions (on the basis of the systems $CuO - MnO - O_2$ and $CoO - MnO - O_2$) took place by means of the simultaneous alkalinic precipitation of the hydrates of copper oxide and manganese oxide (or cobalt oxide and manganese oxide) from the nitric salts of these metals. The production method is discussed in short. Silver contacts were burned into the samples. The composition of the samples is illustrated by means of triangular diagrams. At first the dependence of the electric parameters (i.e. of the electric conductivity and of the activation energy of the electrons) on the composition of the samples is investigated. Resistances were measured by means of a Wheatstone bridge with pulse-like feeding. Experimental results are illustrated

Card 1/3

The Electric Properties of Some Oxide Semiconductors.

by means of diagrams and show the following results: On the basis of mixtures of copper oxide and manganese oxide it is possible to obtain a gamma of semiconductors with conductivities of from 10^{-8} to 10^{-1} $ohm^{-1}.cm^{-1}$. The constancy of the activation energy of this system within a wide range of the ratios Cu:Mn is interesting. According to their composition CO-MnO-O_2 semiconductors have conductivities of from 10^{-3} to 10^{-9} $ohm^{-1}cm^{-1}$ and a considerably greater activation energy. The radiographic analysis showed i.e. that, in connection with the synthesis of samples, new chemical compounds are created which are discussed in short. Also the results of microscopic investigation are discussed on the basis of several illustrations. Accordingly, both groups of semiconductors consist of different crystalline phases; in by far the largest number of cases they have spinell structure. Next, the connection between electric conductivity and the microstructure of the material and with the structure of the crystal lattice is investigated. Among other things, it is probable that in the samples under investigation reciprocal solid solutions are formed at temperatures of more than 800° between

SHEFTEL, I T.

PHASE I BOOK EXPLOITATION 1207

Nauchno-tekhnicheskoye obshchestvo priborostroitel'noy promyshlennosti. Moskovskoye pravleniye

Primeneniye poluprovodnikov v priborostroyenii; trudy konferentsii (Use of Semiconductors in Instrument Making; Transactions of a Conference) Moscow, Mashgiz, 1958. 258 p. 20,000 copies printed.

Ed. (Title page): Chistyakov, N.I., Doctor of Technical Sciences, Professor; Ed. (Inside book): Monastyrskaya, A.M., Engineer; Tech. Ed.: Uvarova, A.F.; Managing Ed. for Literature on Machine Building and Instrument Construction (Mashgiz): Pokrovskiy, N.V., Engineer.

PURPOSE: This book is intended for scientists, engineers and technicians working in the field of instrument making and for teachers and students of technical vuzes.

Card 1/5

Use of Semiconductors in Instrument Making (Cont.) 1207

COVERAGE: The articles in this collection describe semiconductor components of modern instruments, the physical basis of their applications, the principles of designing instruments equipped with semiconductors, and practical experience derived from the application of these instruments in various fields. No personalities are mentioned. There are 111 references, of which 54 are Soviet, 29 English, 17 German, 8 French, 1 Polish, 1 Czech, and 1 Japanese. References appear at the end of each article.

TABLE OF CONTENTS:

AVAILABLE: Library of Congress

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2-17-59

of thermistors and their dependence on a number of factors. Examples of the practical applications of thermistors are given. The design and basic characteristics of industrial types of thermistors produced in the Soviet Union are discussed. The author complains that large groups of technical people still are not familiar with the characteristics and parameters of the various types of thermistors. The present brochure represents, in part, an attempt to disseminate this information and data. It is not an exhaustive treatment of the subject, and does not contain data on thermistors produced by foreign (non-Soviet) firms. No personalities are mentioned. There are 49 references, of which 44 are Soviet (including 3 translations), 3 German, 1 English, and 1 French.

TABLE OF CONTENTS:

Thermistors; Characteristics, Design and Applications 699

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Thermistors; Characteristics, Design and Applications

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AVAILABLE: Library of Congress (TK 7872 .T4S5)

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10-22-58

Card 5/5

SHEFTEL', I.T.; ZASLAVSKIY, A.I.; KURLINA, Ye.V.; TEKSTER-PROSKURYAKOVA, G.N.

Electric properties and structure of complex oxide semiconductors.
Fiz. tver. tela 1 no.2:227-241 F '59. (MIRA 12:5)
(Semiconductors)

81776
S/181/60/002/02/18/033
B006/B067

6,3000

AUTHORS: Burkin, A. L., Sheftel', I. T.

TITLE: Cobalt-manganese Oxide Semiconductor Bolometer

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 2, pp. 288-296

TEXT: In the present article, the authors describe a method of measuring the characteristics of oxide-semiconductor bolometers as well as the construction and the parameters of three bolometer types. Fig. 1 shows the principle of a bolometer circuit. Bolometers are usually characterized by the following main parameters: 1) dimensions of the reception area of the active element in mm; 2) resistance R_{20} of the active element in mohms at 20°C; 3) operating voltage U_w in volts; 4) sensitivity S_f in v/wt or v.cm^2/w at the modulation frequency f of the light flux; 5) time constant τ in msec, which characterizes the thermal inertia of the bolometer; 6) noise emf U_n of the bolometer in v_{eff}; 7) sensitivity threshold $W_{thr.}$ in watts, which is equal to the radiation power and to

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Cobalt-manganese Oxide Semiconductor Bolometer

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B006/B067

the effective noise of the bolometer U_n. Concerning sensitivity and time constant some details of the methods of determination are discussed in more detail. The authors constructed three oxide-semiconductor bolometers on the basis of cobalt-manganese, one of them without backing, one with a quartz, and one with a glass backing: БКМ-1 (BKM-1), БКМ-2 (BKM-2), and БКМ-4 (BKM-4). The first two are especially suited as receivers of light energy in infrared spectroscopes. Figs. 2 and 3 show the constructional details of these two instruments. The BKM-4 bolometer (construction Fig. 4) is used as a contactless telethermometer in industry. The main parameters of several bolometers of the above types are given in Table 2. The reception area covers 0.7 to 5 mm^2; resistance: 0.5-2.5 mohms. Fig. 5 shows the current-voltage characteristics of the bolometers of these three types for a reception area of 2·0.5 mm^2 in air at 20°C and for different τ-values. The bolometer sensitivity was measured by means of a special instrument of the type ПИБ-1 (PIB-1), which was constructed by V. N. Novikov. A Hefner candle served as light source; the light flux was modulated with periodic square pulses

Cobalt-manganese Oxide Semiconductor Bolometer S/181/60/002/02/18/033
B006/B067

(10 cps), the signal was amplified by 10^6 times. The noise level was also measured by means of a PIB-1 instrument, however, without irradiation of the reception element. τ was also measured by means of this instrument. Fig. 6 shows the frequency characteristics of three instruments of the BKM types. In conclusion, the authors thank Professor B. T. Kolomiyets for the organization of the investigations, T. N. Yegorov for participation in the construction, and V. N. Novikov for advice. There are 6 figures, 2 tables, and 12 references: 7 Soviet and 2 British.

SUBMITTED: March 31, 1959

Card 3/3

80155
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B007/B008

24.5500

AUTHORS: Burkin, A.L., Engineer, Filippova, O.N., Engineer, Sheftel', I.T., Candidate of Technical Sciences (Leningrad)

TITLE: Thermoresistor KMT-14

PERIODICAL: Elektrichestvo, 1960, No. 5, pp. 71-73

TEXT: A number of thermoresistors with various parameters were developed in the USSR and are manufactured for the industry at present. If the ambient temperature exceeds 180°C, however, they can not work reliably for a long time. The design and characteristics of the new thermoresistors KMT-14 are given here. They are provided for working at temperatures up to 300°C. The design is shown in Fig. 1 and the dimensions are given. The semiconductor element of the KMT-14 is made in the shape of a bead (diameter = 0.5 mm) from a mixture of cobalt- and manganese oxides. The thermoresistor KMT-14 can be used at increased humidity, in water, and aggressive liquids. The dependence of the resistor on temperature is shown in Fig. 2 for some types of the KMT-14. The static characteristics for such a type, taken at various ambient temperatures, are shown in Fig. 3. It may

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Thermoresistor KMT-14

be seen from them that the KMT-14 can be used as pickup in systems for the automatic control of temperature and in fire-alarm installations (Ref. 4). The maximum working temperatures must however not exceed 150-200°C in these cases. The KMT-14 can be used at temperatures up to 300°C in circuits which work according to the principle of the Wheatstone bridge. The stability of the resistor KMT-14 was checked at 300°C on a great number of types. The results are listed here in a table. They show that an aging at 300°C for 300-400 hours during the manufacturing process is sufficient as a rule for stabilizing the thermoresistor. Such thermoresistors also show a satisfactory stability in the further course over the total range of the working temperatures. There are 4 figures, 1 table, and 4 Soviet references.

SUBMITTED: September 30, 1959

Card 2/2

28090
S/181/61/003/009/024/039
B104/B102

24,7700 (1144, 1160)

AUTHORS: Sheftel', I. T., Zaslavskiy, A. I., Kurlina, Ye. V., and Teksler-Proskuryakova, G. N.

TITLE: Electrical properties and structure of complex oxide semiconductors. II. The systems MnO-CoO-NiO-O_2 and MnO-CuO-NiO-O_2

PERIODICAL: Fizika tverdogo tela, v. 3, no. 9, 1961, 2712-2725

TEXT: In previous articles, the authors have investigated the electrical properties and the structure of the binary systems Mn-Cu, Mn-Co, Cu-Co, and Co-Ni, as well as of the ternary system MnO-CuO-CoO-O_2 (DAN SSSR, 86, 2, 305, 1952; ZhTF, XXVII, 11, 51, 1957; FTT, I, 2, 277, 1959; FTT, sb., v. II, 50, 1959). Here, the authors report on the dependence of the conductivity σ of the above systems on their composition and structure. The production of the samples, the method of X-ray diffraction studies, and the electrical measurements have been described in previous articles. The following annealing temperatures have been chosen in order to ensure a better sintering: For copper-nickel material between 1000 and 1100°C, for

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Electrical properties and ..

nickel-manganese material between 1300 and 1350°C; for materials containing Co, Ni, and Mn between 1200 and 1450°C, and for systems of Cu, Ni, or Mn oxides between 1030 and 1300°C. The relation between the conductivity of the systems $MnO-NiO-O_2$ and $CuO-NiO-O_2$ at room temperature and their composition was studied. It was found that σ shows a maximum in nickel-manganese semiconductors in connection with the formation of $NiMn_2O_4$. This compound has a cubic spinel structure. It is formed purely in compositions with Ni : Mn = 1 : 2 and if the synthesis temperature is 900-1000°C. Annealing at 1300°C partly dissociates the spinel, and the conductivity drops. In the system of copper and nickel oxides, σ shows a maximum and the activation energy ΔE a minimum. These extreme values are related with the formation of solid solutions between the two oxides. The investigation of the temperature dependence of σ for the systems $MnO-CoO-NiO-O_2$ and $MnO-CuO-NiO-O_2$ showed that the law $\sigma = A \exp(\Delta E/2kT)$ (1) is well satisfied for all compositions at temperatures from 20 to 200°C. Table 2 shows data on these semiconductors. A measurement of the thermo-emf at room temperature showed that all materials of the system $MnO-CuO-NiO-O_2$ investigated had a p-type conductivity. In the system of Mn, Ni, and Co oxides one group of semiconductors has a p-type conductivity, and the

other has an n-type conductivity (Fig. 2). For the $MnO-CoO-NiO-O_2$ system copper-cobalt-manganese semiconductors, and the system of Mn, Co, and Ni oxides, the conductivity hardly changed with strong changes of the cation component of the material. The formation of materials with a conductivity of up to 5 $ohm^{-1} cm^{-1}$ is characteristic of the system $MnO-CuO-NiO-O_2$. The role of cations in the conduction mechanism, the structure of the crystal phases for semiconductors of the systems $MnO-CoO-NiO-O_2$ and $MnO-CuO-NiO-O_2$, and the cation distribution in the spinels are thoroughly investigated. It is concluded that the electrical parameters of the semiconductors investigated are a function of their content of manganese cations. The predominating role of manganese with respect to the conductivity of the semiconductors investigated is explained by the presence of Mn ions of different valences in the octahedron cavities of the spinel. Ni, Cu, and Co occur simultaneously as bivalent cations in the semiconductors. The effect of manganese on the conductivity of the semiconductors investigated can be very well explained by comparing the electrical properties of semiconductors containing manganese with those without manganese but otherwise of the same composition. In a later article, such a system

Electrical properties and

($CuO \cdot CoO \cdot NiO \cdot O_2$) will be investigated. N. P. Potapov is mentioned. The authors thank B. T. Kolomiyets for interest, V. G. Prokhvatilov for determining the phase compositions of the semiconductors, as well as Z. V. Karachentseva and A. I. Zharinova for participating in the determination of the cation distribution. There are 9 figures, 3 tables, and 15 references: 5 Soviet and 10 non-Soviet. The three most important references to English-language publications read as follows: M. Kamaiyama, Z. Nara, J. Appl. Phys., Japan, 21, 400, 1952; R. R. Heikes, W. D. Johnston, J. Chem. Phys., 26, 3, 582, 1957; F. J. Morin, Bell Syst. Tech. J., 37, 1047, 1958.

SUBMITTED: April 25, 1961

Card 4/5

28091
S/181/61/003/009/025/039
B104/B102

24,7780 (1144, 1160)

AUTHORS: Sheftel', I. T., Kurlina, Ye. V., and Tekster-Proskuryakova, G. N.

TITLE: Electrical properties and structure of complex oxide semiconductors. III. The system CuO-CoO-NiO-O_2

PERICDICAL: Fizika tverdogo tela, v. 3, no. 9, 1961, 2726-2734

TEXT. The conductivity and the structure of semiconductors belonging to the system CuO-CoO-NiO-O_2 are studied. The results are compared with properties of semiconductors containing manganese and belonging to the system of Mn, Cu, Co, and Ni oxides. It was aimed at finding the role of manganese in the conduction mechanism of these materials. Thorough investigations of the temperature dependence of conductivity showed that the temperature dependence of σ is not only a function of the cation components of the material. The law $\sigma = A \exp(-\Delta E/2kT)$ is only valid in relatively small temperature ranges. It was established that there is no relationship between the electrical parameters and the cation component of Cu, Co, and Ni oxide semiconductors (as is the case with semiconductors

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Electrical properties and ...

containing manganese). At certain mixture ratios, σ, ΔE, and A will not only change with small changes of the cation component but also if the thermal treatment is changed. Materials containing chiefly Ni oxide possess the lowest conductivity and the greatest A. Unlike binary and ternary manganese systems, no thermally stable crystal phase with a spinel structure is formed in materials produced on the basis of Cu, Co, and Ni oxides. The formation of thermally stable spinel-type compounds is attributed to the manganese cations. The effect of thermal treatment in air at various temperatures has been studied in a number of tests. It was found that a thermal treatment at 500-700°C will increase σ, but one at 800°C will decrease σ. The change of resistivity of the samples as a function of the annealing time at 600 and 800°C was also studied. The results are shown in Figs. 6 and 7 The influence of oxygen on the conductivity during thermal treatment was studied in test series performed in various gas media and in a vacuum of $\sim 10^{-3}$ mm Hg. It was established that the strong effect of thermal treatment on σ is connected with an oxidation or reduction during the annealing process. Annealing in oxygen at 600°C increases σ as much as a thermal treatment in air. A number of compositions showed that the partial pressure of oxygen influences the

Electrical properties and ...

conductivity. Annealing at 600°C in a neutral gas decreased σ considerably, but annealing at 800°C increased σ. Annealing at 600°C in vacuo did not essentially decrease the conductivity. The results are finally discussed, and it is noted that the electrical conductivity of the materials investigated is not only a function of the cation component but also a function of the stoichiometric disturbances (changes of the metal-to-oxygen ratio). The low thermal stability is related to the formation of compounds between the initial components. In the semiconductors investigated and also in materials containing manganese, the conductivity is related to the ion content of one and the same material in various valence states. These are Mn cations in materials containing manganese, and in Co and Cu ions the semiconductors studied. In materials containing manganese, the number of Mn cations remains practically constant during annealing. In materials without Mn, the number of metal-cation pairs is increased during annealing at about 600°C, which is due to additional oxidation. Therefore, σ increases. The authors thank B. T. Kolomiyets for interest, A. I. Zaslavskiy for a discussion of the results, and V. G. Prokhvatilov for X-ray diffraction studies. There are 9 figures, 2 tables, and 6 references: 4 Soviet and 2 non-Soviet

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TEKSTER-PROSKURYAKOVA, G.N.; SHEFTEL', I.T.

Semiconducting barium-strontium titanates with positive temperature-dependent resistance coefficient. Fiz. tver. tela 5 no.12 :3463-3472 D '63. (MIRA 17:2)

SHEFTEL', I.T., kand.tekhn.nauk; SHCHINA, N.I., inzh.; FILIPPOVA, O.N., inzh.; CHEBOTAREVA, L.S., inzh.

Quick-response bead-type thermistors. Vest. elektroprom. 34 no.8:71-73 Ag '63. (MIRA 16:9)

(Thermistors)

L 9576-66 EWT(l)/EWT(m)/EWP(w)/T/EWP(t)/EWP(b) IJP(c) JD
ACC NR: AP5027443 SOURCE CODE: UR/0181/65/007/011/3445/3447

AUTHOR: Sheftel', I. T.; Pavlotskiy, Ya. V.

ORG: none

TITLE: Electrical conductivity and thermoelectromotive force in some manganese spinels

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3445-3447

TOPIC TAGS: electric conductivity, manganese compound, thermoelectromotive force

ABSTRACT: The authors study the electrical conductivity σ and thermoelectromotive force α of the cubic spinels $CuMn_2O_4$, $LiMn_2O_4$, $NiMn_2O_4$ and $MnCo_2O_4$, the tetragonal spinel $CoMn_2O_4$ and a number of ternary solid solutions in the system of Mn, Co, Ni and Cu oxides. The values of σ and α were measured as a function of temperature in the 200-1100°K range. It was found that σ always increases exponentially with temperature. A change in sign was observed for α as a function of temperature in $NiMn_2O_4$. This and other variations in the temperature relationships for α are not reflected in the corresponding relationships for σ. The formula

$$Me^{2+}_{\beta x}Mn^{3+}_{\gamma x(1-\beta)}Mn^{2+}_{1-x[\beta+\gamma(1-\beta)]}[Me^{2+}_{x(1-\beta)}Mn^{3+}_{2-x(1-\beta)(2-\gamma)}Mn^{4+}_{x(1-\beta)(1-\gamma)}]O^{2-}_4,$$

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is proposed for manganese spinels of the type

$$Me_xMn_{3-x}O_4\ (0 \leqslant x \leqslant 1),$$

where Me = Ni, Co or Cu

$$0 \leqslant \beta \leqslant 1 \quad \text{and} \quad 0 \leqslant q \leqslant 1.$$

This formula may be used for explaining the values of σ and α as functions of composition due to variation in the ratio of trivalent to tetravalent manganese in octahedra. The authors thank B. T. Kolomiyts for constant interest in the work, V. P. Zhuze, L. S. Stil'bans and E. Ye. Vaynshteyn for useful consultation, M. V. Golomolzina for synthesizing the $LiMn_2O_4$ and stoichiometric $NiMn_2O_4$ spinels, and V. G. Prokhvatilov and Ye. I. Gindin for x-ray structural analysis of the specimens. Orig. art. has: 2 figures, 1 formula.

SUB CODE: 20/ SUBM DATE: 27Apr65/ ORIG REF: 006/ OTH REF: 005

Card 2/2

L 30249-66 EWT(m)/T/EWP(w)/EWP(t)/ETI IJP(c) JD/HW
ACC NR: AP6015074 (N) SOURCE CODE: UR/0363/66/002/005/0918/0928

AUTHOR: Sheftel', I. T.; Pavlotskiy, Ya. V.

ORG: none

TITLE: Electrical conductivity and thermal emf in the system of Mn, Co, Ni and Cu oxides

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 2, no. 5, 1966, 918-928

TOPIC TAGS: thermal emf, electric conductivity, manganese compound, cobalt compound, nickel compound, copper compound, temperature dependence, semiconducting material

ABSTRACT: The electrical conductivity σ and thermal emf α of a series of semiconductors were measured over a wide temperature range (200-1100°K) in the ternary systems MnO-CoO-CuO-O_2 and MnO-CoO-NiO-O_2. In addition, cubic spinels $NiMn_2O_4$ containing active oxygen and $LiMn_2O_4$ were studied. The data indicate that Co, Cu, and Ni enter into the composition of the compounds in the form of divalent ions, and that the mechanism of conductivity is based on a mechanism of migration of charge carriers between the Mn^{3+} and Mn^{4+} ions, located at octahedral positions of the spinels. In the temperature dependence of σ (up to 1100°K), no segments of impurity and intrinsic conductivity, characteristic of band semiconductors, were observed. The change in the sign of α for $NiMn_2O_4$ and inflections in the temperature dependence of α for a series

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ACC NR: AP6015074

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of compositions practically are not associated with any changes in the temperature dependence of σ. In the 200-1000°K range, σ increases by 5 to 6 orders of magnitude, whereas α is very small and changes very little with temperature, indicating a very high concentration of charge carriers and a slight dependence of this concentration on the temperature. This shows a very low charge carrier mobility. The authors are sincerely grateful to B. T. Kolomiyets for his constant interest and attention to this work and to E. Ye. Vaynshteyn for a useful discussion; they also thank M. V. Golomolzina for synthesizing the spinels $LiMn_2O_4$ and stoichiometric $NiMn_2O_4$, V. G. Prokhvatilov and Ye. I. Gindin for an x-ray structural study of the compositions, and V. N. Novikov for providing the results of his investigation of the system of Ni and Mn oxides. Orig. art. has: 5 figures, 7 formulas.

SUB CODE: 20/ SUBM DATE: 11Jun65/ ORIG REF: 012/ OTH REF: 013

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L 27064-66

ACC NR: AP6014245 SOURCE CODE: UR/0109/66/011/005/0907/0915

AUTHOR: Tekster-Proskuryakova, G. N.; Sheftel', I. T.

ORG: none

TITLE: Thermistors with positive temperature coefficient of resistance

SOURCE: Radiotekhnika i elektronika, v. 11, no. 5, 1966, 907-915

TOPIC TAGS: thermistor / ST5-1 thermistor

ABSTRACT: Technical data of a new industrial ST5-1 thermistor is reported, and its possible applications are described. The pellet-type ST5-1 thermistor is made from Ce-alloyed $BaTiO_3$ and has these nominal characteristics: resistance at 20--25C, 20--150 ohms; maximum temperature coefficient corresponds to 120--130C; resistance at 190--200C, 30 kohms or higher; resistance ratio, 1000 or higher; temperature coefficient of resistance at 125--135C, 20% per 1C or more; working-temperature range, -20 +200C; positive temperature coefficient of resistance exists within 120--190C; maximum power, 0.8 w; minimum power 10 mw; dissipation factor, 4 mw per 1C; time constant, 10--15 sec; life, 3000 hrs. Plots of thermistor resistance and temperature coefficient of resistance vs. ambient temperature and thermistor I-V characteristics are shown. After 1 year of shelf storage, the thermistor resistance increases by 5--15% and then remains stable; 8000 thermal cycles at 50--200--50C practically did not affect the R-T curve. Possible applications of the new thermistor, such as

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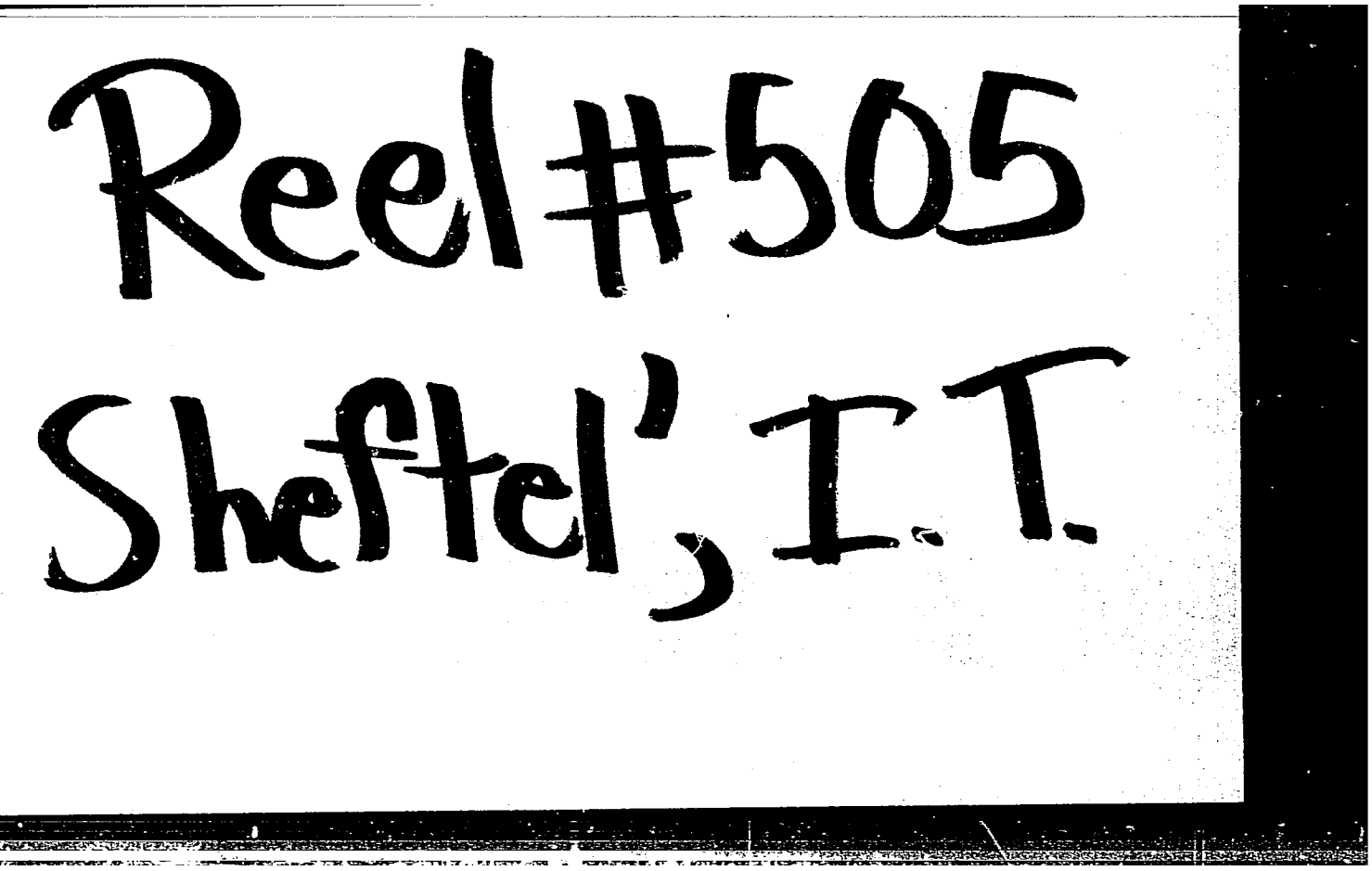
temperature control, current limiter, flow meter, etc. are considered in detail in the articles by O. Saburi et al., (IEEE Trans., 1963, CP-10, 2, 53) and by I. I. Courtin (Westinghouse Eng., 1962, 22, 4-5, 116). Orig. art. has: 12 figures, 3 formulas, and 1 table. [03]

SUB CODE: 09 / SUBM DATE: 21Dec64 / ORIG REF: 003 / OTH REF: 009/ ATD PRESS: 4254

Card 2/2 KV



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